Gas Leak on Converter 2nd Pass Outlet

$P/P_A = 1.356$ less than 1.893 $[(k + 1) / 2]^{k/(k-1)}$ therefore the flow is non-choked (i.e. subsonic), AND the following equation applies

$$Q = CAP\sqrt{(2g_c/ZRT)(K/K-1)[(P_A/P)^{2/K} - (P_A/P)^{(K+1)/K}]}$$

				psia	psig	in WC
Q = mass gas flow (lbs/s)		K = C_p/C_v of the gas	1.4			
C = discharge coefficient	0.65	P = source pressure absolute (lb/ft^2)	2871	19.9	5.2	145
Equivalent Diameter of hole (in)	0.77	P_A = ambient pressure absolute (lb/ft^2)	2117	14.7		
A = area of hole (ft^2)	0.00323	M = molecualr weight of gas	34			
g_c = gravitational constant (ft/s)	32.17	Z = compressibility factor	1.077063			
R = gas constant (ft-lb/lb mol - °R)	1543.3	Release duration (seconds)	35,496			
T = temperature (°R)	1410 510 °C	SO$_3$ concentration in gas (wt%)	22.4			
Molecular weight of SO$_3$	80	SO$_2$ concentration in gas (wt%)	2.0			
		Molecular weight of SO$_2$	64			

Intermediate Calculations:
0.000934
3.5
0.647034
0.593079
6.031606

Mass Calculations:

Q = 0.0801 lbs/s
Total mass: 2843 lbs
Total SO$_3$ mass: 318 lbs   Note: SO3 immediately reacts with H2o to for acid mist; RQ for acid mist = 1,000 lbs
Total SO$_2$ mass: 28 lbs

Reference: "Perry's Chemical Engineering Handbook, 6th Edition, McGraw-Hill 1984"